

# In-line diaphragm seal with sterile connection For sanitary applications Models 981.18, 981.19, 981.20 und 981.21, threaded connection

WIKA data sheet DS 98.40



## Applications

- For direct, quickly removable installation in pipelines
- For flowing, pure media
- Food and beverage production
- For dairies, dairy products, breweries, soft drink production

## Special features

- Completely round diaphragm (Europ. Pat. No. 0609846) to avoid dead spaces
- Self-draining in all mounting positions
- Quick cleaning of measuring point, without residue
- Suitable for SIP and CIP
- 3-A compliant

## Description

Diaphragm seals are used to protect the pressure measuring instrument from aggressive, adhesive, crystallising, corrosive, highly viscous, environmentally hazardous or toxic media. A diaphragm made of the appropriate material provides for the separation from the medium to be measured. Thus even the most difficult measuring requirements can be met by combining measuring instruments with diaphragm seals.

A fluid inside the system, which can be chosen to suit the particular application, hydraulically transmits the pressure to the measuring instrument.

Almost limitless application possibilities exist due to the large number of available variants, such as diaphragm seal designs or materials. The type of process connection (flange, threaded and sterile connection) and the basic method of manufacture are important design differentiation criteria.

For further technical information on diaphragm seals and diaphragm seal systems see IN 00.06 "Application, operating principle, designs".

The model 981.18, 981.19, 981.20 and 981.21 in-line diaphragm seals with threaded connections, due to their



**In-line diaphragm seal with sterile connection, model 981.18**

circular design, can be mounted directly into the pipeline, meaning no special measuring point connection is required. Through the integration into the process line, turbulences, dead spaces, corners and other obstructions can be avoided. For this diaphragm seal WIKA uses a completely round diaphragm, which, due to the unobstructed flow of the media, produces an automatic cleaning of the chamber.

The diaphragm seal systems can withstand the cleaning vapour temperatures occurring in the SIP processes and thus ensure a sterile connection between the medium to be measured and the diaphragm seal.

Assembly of the diaphragm seal and measuring instrument is made via a direct assembly as standard or optionally via a cooling element or a flexible capillary.

For the material selection WIKA offers a variety of solutions, in which the main body and the diaphragm are made of identical materials. Stainless steel 316L (1.4435) is used as standard material, other special materials are available on request.

Measuring systems with model 981.18, 981.19, 981.20 and 981.21 WIKA diaphragm seals are successfully used in the life science industry, in food production, pharmaceutical and biotechnology applications.

## Standard version

### Type of process connection

Threaded coupling, on both sides

Model 981.18: Threaded pipe connection DIN 11851

Model 981.19: Threaded connection SMS standard (SS 3352)

Model 981.20: Threaded connection IDF standard (ISO/DIS 2853 and BS 4825 part 4)

Model 981.21: Threaded connection APV-RJT standard (BS 4825 part 5)

For exact designs and nominal widths see tables on page 4 to 5

### Nominal pressure

PN 40 bar for DN 20 ... DN 40 or DN 1" ... DN 2"

PN 25 bar from DN 50 or DN 2 1/2"

### Measuring ranges

min. 0 ... 0.6 bar, max. 0 ... 40 bar

(also vacuum and +/- measuring ranges)

### Material of main body

Stainless steel 1.4435 (316 L)

### Material of wetted parts

Diaphragm: Stainless steel 1.4435 (316L)

### Surface roughness of wetted parts

$R_a \leq 0.76 \mu\text{m}$  per ASME BPE SF3 (except for weld seam)

### Level of cleanliness of wetted parts

Oil and grease free per ASTM G93-03 level E (WIKA standard) and ISO 15001 ( $< 550 \text{ mg/m}^2$ )

### Connection to the measuring instrument

Weld-in connection

## Options

- Higher nominal pressures on request (for maximum pressure range consider pressure rating of clamp)
- Surface roughness of wetted parts  
 $R_a \leq 0.38 \mu\text{m}$  per ASME BPE SF4, only with electropolished surface (except for weld seam)
- Sealing from NBR or PTFE
- Zero point stabilisation (ZPS, required for SIP processes, EHEDG tested)
- Connection to the measuring instrument  
G 1/2, G 1/4, 1/2 NPT or 1/4 NPT (female)
- Origin of wetted parts (EU, CH, USA)
- Marking of the diaphragm seal with 3-A standard 74-06

## Materials

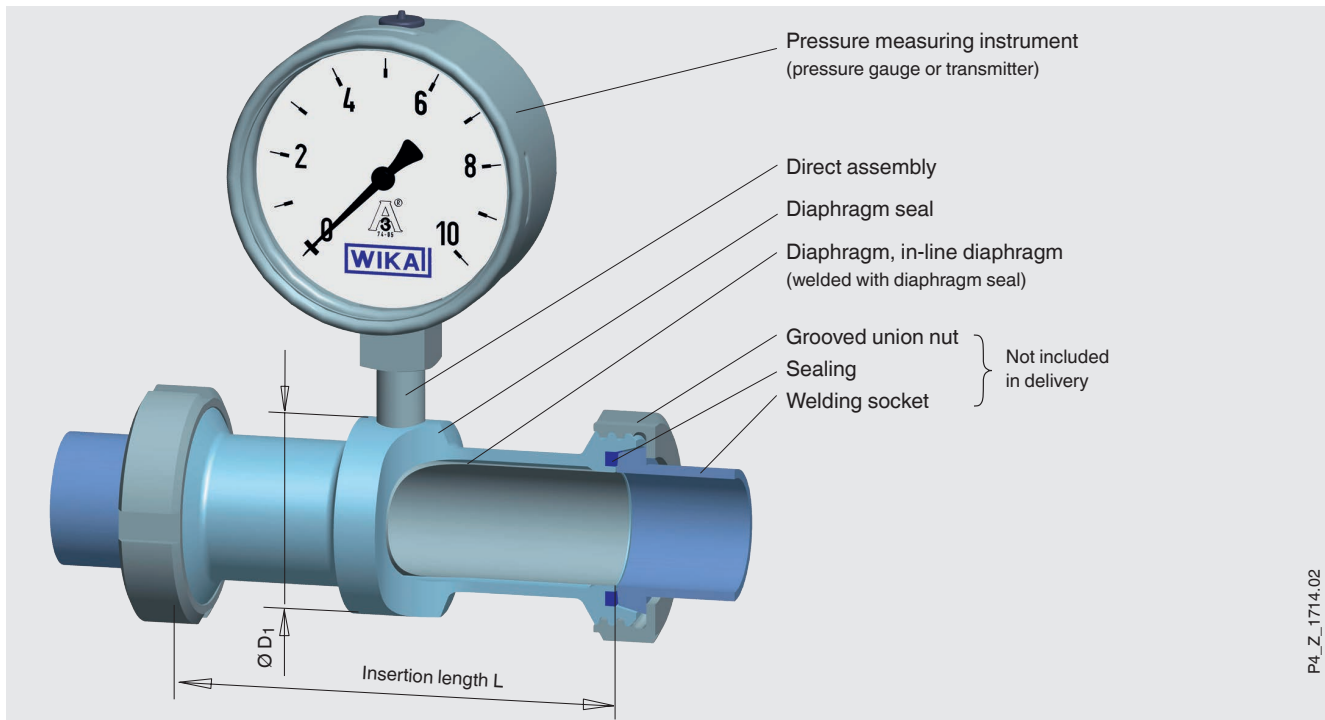
Main body	Wetted part Diaphragm
<b>Standard</b>	
Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L)
<b>Option</b>	
Stainless steel 1.4435 (316L), electropolished <sup>1)</sup>	Stainless steel 1.4435 (316L), electropolished <sup>1)</sup>
Stainless steel 1.4539 (904L)	Stainless steel 1.4539 (904L)
Hastelloy C276 (2.4819)	Hastelloy C276 (2.4819)

1) Only in connection with a surface roughness of  $R_a \leq 0.38 \mu\text{m}$  for the wetted parts

Further material combinations on request

## Installation example

In-line diaphragm seal, sterile connection, model 981.18 with directly assembled pressure gauge in a pipeline



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## Additional information for diaphragm seal systems

See Technical information IN 00.06 “Diaphragm seals - Diaphragm seal systems, application, operating principle, designs”

- Pressure measuring instrument model
- Connection to the measuring instrument: Direct assembly (for types of instrument connection see below, calibrated in the mounting position selected for the in-line diaphragm seal)
- Process temperature
- Ambient temperature
- System fill fluid
  - Recommendation for the food and beverage production: Neobee® KN 59 (FDA 21 CFR 172.856, 21 CFR 174.5)
  - Recommendation for pharmaceutical and cosmetics applications: Medicinal white mineral oil KN 92 (FDA 21 CFR 172.878, 21 CFR 178.3620(a); USP, EP, JP)

## Options for diaphragm seal systems

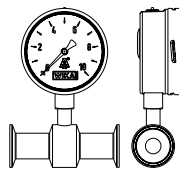
- Connection to the measuring instrument via cooling element or capillary
- Further pressure measuring instruments possible
- Vacuum service (suitable for vacuum operation)
- Higher level of cleanliness of wetted parts
  - Oil and grease free
  - PWIS-free cleaned (free of paint wetting impairment substances)
- Height difference between measuring point and pressure measuring instrument with capillary in metre increments (max. 7 m with silicone oils/edible oils)
- Mounting bracket (required for connection to the measuring instrument via capillary, model 910.16, data sheet AC 09.07)
  - Form H per DIN 16281, 100 mm, aluminium, black
  - Form H per DIN 16281, 100 mm, stainless steel
  - Bracket for pipe mounting, for pipe Ø 20 ... 80 mm, steel
- Special version
  - Complete measuring assembly autoclavable, on request

## Assembly of the pressure measuring instrument

### ■ For horizontal pipelines

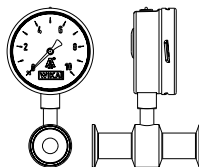
#### Variant 1

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



#### Variant 2

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Parallel to flow direction
- Assembly: Direct assembly, horizontal pipeline



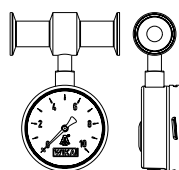
#### Variant 3

- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



#### Variant 4

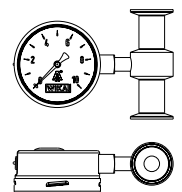
- Pressure measuring instrument: Connection location at 12 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



### ■ For vertical pipelines

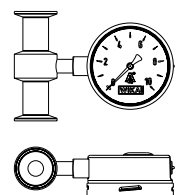
#### Variant 1

- Pressure measuring instrument: Connection location at 3 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



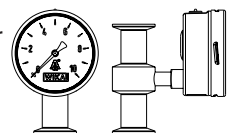
#### Variant 2

- Pressure measuring instrument: Connection location at 9 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



#### Variant 3

- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline

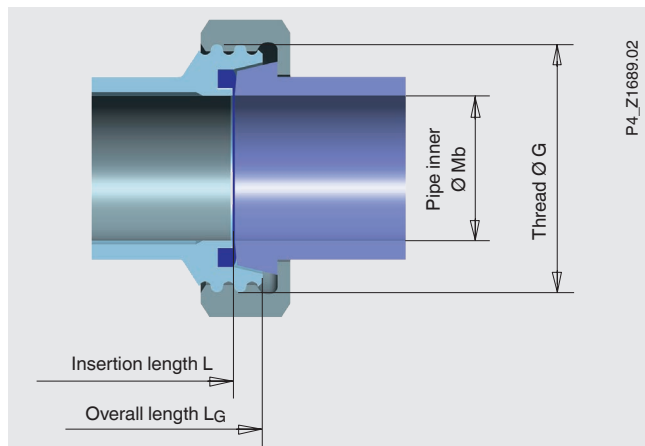


## Dimensions in mm

### Model 981.18

Type of process connection: Threaded pipe connection following DIN 11851

Pipe standard: Pipes per DIN 11850 row 2



3-A compliant (only in combination with a sealing with support ring per ISO 2853)



EHEDG compliant (only in combination with a Kalrez® stainless steel gasket from Dupont de Nemours or with a T-ring seal from Combifit International B.V.)

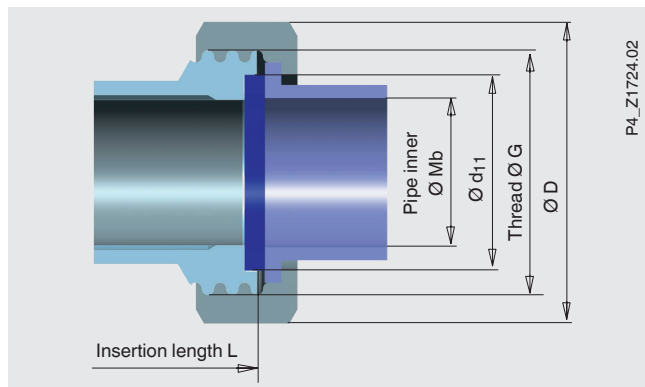
The model 981.18 diaphragm seals can also be used for pipes per DIN 11850 row 3.

DN	For pipe Outer Ø x wall thickness	PN	Dimensions in mm					Weight in kg
			G	L	D <sub>1</sub>	Mb	L <sub>G</sub>	
15	19 x 1.5	40	RD 34 x 1/8	96	34	16	39.8	0.4
20	23 x 1.5	40	RD 44 x 1/6	106	44	20	39.8	0.6
25	29 x 1.5	40	RD 52 x 1/6	114	52	26	39.8	1.0
32	35 x 1.5	40	RD 58 x 1/6	126	58	32	45.8	1.3
40	41 x 1.5	40	RD 65 x 1/6	146	65	38	51.8	1.9
50	53 x 1.5	25	RD 78 x 1/6	156	78	50	63.8	2.8
65	70 x 1.5	25	RD 96 x 1/6	166	95	66	80.8	3.7
80	85 x 2	25	RD 110 x 1/4	166	110	81	94.8	4.4
100	104 x 2	25	RD 130 x 1/4	162	130	100	94.8	5.8

### Model 981.19

Type of process connection: Threaded connection following SMS standard (SS 3352)

Pipe standard: Pipes per ISO 1127 row 2 or ISO 2037/1992

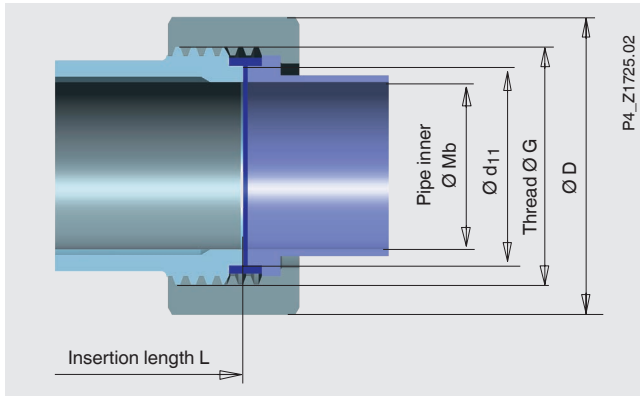


DN	For pipe Outer Ø x wall thickness	PN	Dimensions in mm						Weight in kg
			G	L	D <sub>1</sub>	Mb	D	d <sub>11</sub>	
1"	25.0 x 1.2	40	RD 40 x 1/6	120	40	22.6	51	32	0.6
1 1/2"	38.0 x 1.2	40	RD 60 x 1/6	152	60	35.6	74	48	1.6
2"	51.0 x 1.2	40	RD 70 x 1/6	162	70	48.6	84	61	1.9
2 1/2"	63.5 x 1.2	25	RD 85 x 1/6	162	85	60.3	100	73.5	2.7
3"	76.1 x 1.6	25	RD 98 x 1/6	162	98	73	114	86	3.2

### Model 981.20

Type of process connection: Threaded connection following IDF standard  
(ISO/DIS 2853 and BS 4825 part 4)

Pipe standard: Pipes per ISO 1127 row 2 or ISO 2037/1992



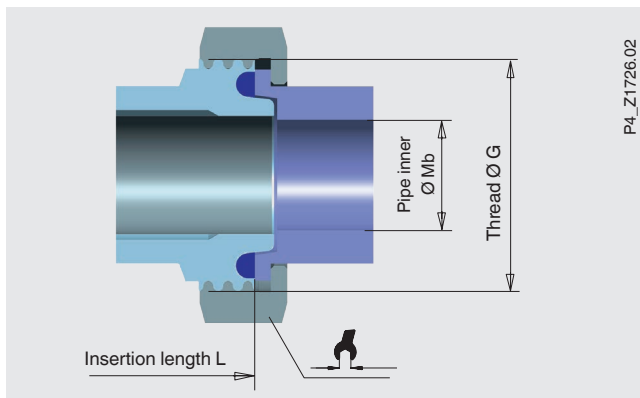
3-A compliant (only in combination with a sealing with support ring per ISO 2853)

DN	For pipe Outer Ø x wall thickness	PN	Dimensions in mm						Weight in kg
			G	L	D <sub>1</sub>	Mb	D	d <sub>11</sub>	
1"	25.0 x 1.2	40	1" IDF	114	40	22.6	48	29.2	0.5
1 1/2"	38.0 x 1.2	40	1 1/2" IDF	146	55	35.6	64	42.7	1.0
2"	51.0 x 1.2	40	2" IDF	156	68	48.6	77	56.2	1.3
2 1/2"	63.5 x 1.6	25	2 1/2" IDF	156	80	60.3	91	69.9	2.4
3"	76.1 x 1.6	25	3" IDF	156	95	72.9	106	82.6	2.9

### Model 981.21

Type of process connection: Threaded connection following APV RJT  
standard (BS 4825 part 5)

Pipe standard: Pipes per BS 4825 part 1 or O.D.-tube



DN	For pipe Outer Ø x wall thickness	PN	Dimensions in mm					Weight in kg
			G	L	D <sub>1</sub>	Mb	SW	
1"	25.4 x 1.6	40	1 13/16 x 8"	123.4	47	22.2	50	0.5
1 1/2"	38.1 x 1.6	40	2 5/16 x 8"	155.4	59	34.9	65	1.0
2"	50.8 x 1.6	40	2 7/8 x 6"	165.4	74	47.6	80	1.3
2 1/2"	63.5 x 1.6	25	3 3/8 x 6"	165.4	86	60.3	92	2.4
3"	76.2 x 1.6	25	3 7/8 x 6"	165.4	99	73	105	2.9

## Approvals

- GOST-R, import certificate, Russia

## Certificates <sup>1)</sup>

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy for diaphragm seal systems)
- 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metallic parts, indication accuracy for diaphragm seal systems)
- FDA conformity of the system fill fluid
- 3-A conformity of the diaphragm seal, based on a third party verification, in accordance with 3-A standard 74-06
- EHEDG conformity of the model 981.18 diaphragm seal (only in combination with a Kalrez® stainless steel gasket from Dupont de Nemours or with a T-ring seal from Combifit International B.V.)
- Manufacturer's declaration regarding EU regulation 1935/2004 EC
- Others on request

1) Option

Approvals and certificates, see website

## Ordering information

Diaphragm seal:

Diaphragm seal model / Process connection (type and specification of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / Zero point stabilisation (ZPS) / Connection to the measuring instrument / Level of cleanliness of wetted parts / Origin of wetted parts / Certificates

Diaphragm seal system:

Diaphragm seal model / Process connection (type and specification of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / Zero point stabilisation (ZPS) / Pressure measuring instrument model (per data sheet) / Assembly (direct assembly, cooling element, capillary) / min. and max. process temperature / min. and max. ambient temperature / Vacuum service / System fill fluid / Certificates / Height difference / Level of cleanliness of wetted parts / Origin of wetted parts / Mounting bracket

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